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1    **Meaning in animal and human communication**

2

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8

9    **Abstract:**

10    What is meaning? While traditionally the domain of philosophy and linguistics, this question, and  
11    others related to it, is critical for cognitive and comparative approaches to communication. This  
12    short essay provides a concise and accessible description of how the term meaning can and should  
13    be used, how it relates to ‘intentional communication’, and what would constitute good evidence  
14    of meaning in animal communication, in the sense that is relevant for comparisons with human  
15    language.

16

17    **Keywords:** communication; meaning; intentionality; language; primates; pragmatics

18    **Word count** (main text plus table): 3,320

19

20

## 21    **Introduction**

22            In any discussion of communication, human, animal, or otherwise, it is hard to avoid the  
23    term *meaning*. An intuitive use of the term is to describe the effects that a signal tends to have,  
24    and/or the objects that it tends to pick out in the world. It is, for instance, a natural turn of phrase  
25    to say that the famous vervet alarm calls mean ‘snake’, ‘eagle’, and ‘leopard’. At the same time, it  
26    is also natural to use meaning to refer to the cognitive aspects of human communication: when  
27    we talk about the meaning of words, what we mean to refer to is not just the literal translation of  
28    those words, but also the intentions that we have as speakers. For instance, when we say “Can  
29    you pass me the sugar?”, we (typically) do not simply wish to enquire about whether the audience  
30    is able to pass the sugar; we instead mean that we would actually like them to pass us the sugar.  
31    Meaning, then, is a ubiquitous term, that appears to have at least two related but different uses.

32            This potential for ambiguity around meaning can make comparisons between human and  
33    animal communication hazardous. Are any animal signals, such as birdsong or the vervet alarm  
34    calls, meaningful in the way that words are? If so, how, and to what extent? To answer these  
35    questions, we need a concise account of how the term meaning can and/or should be used in  
36    comparisons between human and animal communication.

37            In this short essay, I provide such an account. In the following sections I: (i) provide a brief  
38    background, focusing on recent critiques of how meaning and associated terms are used; (ii)  
39    describe how meaning is typically used in the philosophical and pragmatics literature; (iii) discuss  
40    the relationship between the causal and philosophical uses of meaning; (iv) explain how meaning  
41    relates to the way that ‘intentional communication’ has been operationalised in the animal  
42    communication literature; and (v) describe what would need to be shown to demonstrate that any  
43    non-human communication system is meaningful in the way that human communication is. In  
44    sum, this paper satisfies a pressing need for a concise and accessible description of what

45 constitutes meaning in animal communication, in the sense that is relevant for comparisons with  
46 human language.

47

## 48 **Meaning in animal communication**

49         The language of communication – not just meaning, but other related concepts too, such  
50 as information and reference – has historically been used in the animal communication literature  
51 often in a loose and largely intuitive way. Researchers often write that a particular animal signals  
52 ‘means’, ‘refers to’, or ‘carries information about’ some particular feature of the world. However,  
53 the degree to which such statements are meant to encourage the thought that the signal in  
54 question is similar to or possibly even related to human communication varies between cases. In  
55 some instances, such comparisons are very much the point, while in others, this language is used  
56 only as shorthand: a convenient way to describe, in a metaphorical way, how a given signal  
57 appears to work.

58         Some researchers have critiqued these and associated practices at length, arguing that the  
59 use of terms that have been co-opted from linguistics, and other disciplines that study human  
60 communication, is wont to lead animal communication research astray (Owings & Morton, 1997;  
61 Owren & Rendell, 2001; Owren et al., 2010; Rendall et al., 2009; Wheeler & Fischer, 2012). The  
62 nub of the matter is that when it comes to between-species comparisons, we do not want to pre-  
63 judge matters, but casual use of terms such as meaning – for which there is a rich philosophical  
64 literature – substantially increases the chances that we will inadvertently do so. Such critiques  
65 have had significant impact in recent years (see Stegmann, 2013 for a collection of views). This has  
66 been especially true in non-human primate communication research, perhaps unsurprisingly,  
67 given that comparisons with human communication are one of the primary motivations for such  
68 research. This increased care over terminology has encouraged researchers to consider in detail  
69 how the existence of human-like ‘meaning’ (not to mention other, related concepts) could be

70 tested for in non-human primate communication. However, there is not as yet any consensus on  
71 this.

72         What, then, would constitute good evidence of animal signals having human-like meaning?  
73 One recent study, explicitly motivated by comparisons with human language, and aware of the  
74 fact that we cannot simply ascribe word-like meaning to signals willy-nilly, claimed to have  
75 identified the ‘meaning’ of chimpanzee gestures based on documentation of gestures that were  
76 intentionally produced, and which consistently led to apparently satisfactory outcomes (Hobaiter  
77 & Byrne, 2014). Are these criteria – intentional production and persistent, satisfactory outcomes –  
78 appropriate? If not, what would be? To answer these questions, we must turn to philosophy and  
79 pragmatics, and discuss the meaning of meaning itself.

80

## 81 **Meaning in human communication**

82         In a famous essay, entitled simply ‘Meaning’, the philosopher Paul Grice distinguished  
83 between *natural meaning* and *non-natural meaning* (1957). Natural meaning describes stable  
84 relationships between two things in the world, where one reliably predicts the other. Those spots  
85 ‘mean’ measles; that noise ‘means’ trouble. Non-natural meaning, in contrast, is the meaning that  
86 a speaker intends to communicate when they use language and some other forms of human  
87 communication.

88         Grice stated three criteria for something to qualify as having non-natural meaning. The first  
89 is that the signaller must intend to achieve in the audience a particular response. Second, the  
90 audience must recognise that the speaker has this intention. Suppose that we are in a bar. It is  
91 your turn to buy the drinks, and I would like another. I intend for you to believe this (the first of  
92 Grice’s criteria, above), and I therefore make sure that my empty glass is visible to you. However,  
93 suppose that I do not do anything to explicitly bring attention to it. With regards such cases, Grice  
94 argued that there is not enough going on here to say that I *meant* that I would like another drink.

95 All I have done is provided evidence that might or might not indicate as much. Grice thus added  
96 the following, third criterion to address this: that the listener should recognise the speaker's  
97 intention, and the listener should grasp the intended meaning at least in part because he  
98 recognises the speaker's intention. This criterion is satisfied if, rather than simply ensuring that my  
99 empty glass is visible, I make eye contact with my friend and simultaneously tilt my wine glass, or  
100 express my intentions in some other conspicuous way. Here, not only do I intend that my friend  
101 believes that I would like another drink, but my friend believes this in part because she recognises  
102 that this is my very intention. Now we can say that I *mean* that I would like another drink. The  
103 Stanford Encyclopedia of Philosophy summarises these three criteria using an example of a driver  
104 who flashes her car lights at another driver, with the intention that the other driver will realise  
105 that he does not have his own lights on. Here, the driver who flashes her lights intends that: (i) the  
106 other driver should come to believe that his lights are not on; (ii) the other driver recognises that  
107 this change in belief is the first driver's intention; and (iii) this recognition is part of his reason for  
108 believing that his lights are not on.

109 This Gricean analysis dominates contemporary discussion of meaning. Many modifications  
110 and reformulations have been proposed (e.g. Strawson, 1964; Schiffer, 1972; Neale, 1992; Sperber  
111 & Wilson, 1995; Recanati, 2004). Animal communication researchers should not expect that the  
112 philosophy of language will speak with a single voice on the matter of meaning any time soon.  
113 Nevertheless, it is fair to say that Grice's key insight remains central to most discussion. That key  
114 insight is that meaning is auto-deictic: stimuli that have non-natural meaning point to the very  
115 intentions that triggered their production in the first place.

116 Another way to make this point is to say that meaningful communication is not only  
117 intentional, it is also *overtly* intentional – it brings attention to the intentions that are being  
118 expressed. When, for instance, I tilt my coffee cup to request a refill, I do so in a way that brings  
119 attention not only to the fact that my cup is empty, but also to the fact that the tilt is

120 communicative i.e. to the very fact that I am trying to communicate in the first place. Similarly,  
121 when I speak, I provide evidence not only for what I wish to communicate, but also for the very  
122 fact that I am trying to communicate something. My behaviour is overtly intentional.

123

## 124 **Meaning and levels of analysis**

125       Clearly, not all animal signals are meaningful in this way. Many animal communication  
126 researchers, when they say that a particular signal ‘means’ something, do not actually wish to say  
127 that something as cognitively rich as the notion described above is being used. For instance,  
128 birdsong can be said to ‘mean’ something like ‘come mate with me’, but I doubt that researchers  
129 that use such language wish to commit themselves to the view that birdsong involves the  
130 expression and recognition of intentions, in the way described above. In general, the term  
131 meaning tends to be used in the animal literature more simply, as a way to describe the effect that  
132 a signal has, and/or the object that it picks out in the world. This raises the question of how the  
133 Gricean notion of meaning, described above, relates to the more intuitive use that is common in  
134 the animal communication literature.

135       The key difference between Gricean (non-natural) meaning and meaning in this more  
136 intuitive sense is that they describe different levels of analysis. Specifically, whereas the  
137 philosophical notion of meaning describes how a particular set of proximate mechanisms (namely  
138 intentions) can work to make communication possible, the more colloquial usage describes the  
139 ultimate level function(s) that a signal has, and/or the effects it reliably has on receivers (Krebs &  
140 Dawkins, 1984). (This ultimate/proximate distinction is central to evolutionary approaches to  
141 behaviour. Put briefly, ultimate level explanations are concerned with *why* a trait exists, while  
142 proximate level explanations are concerned with *how* it works (see Davies et al., 2012; Scott-  
143 Phillips et al., 2011).) For example, the function of mating calls is to cause in others a willingness to  
144 mate, and the function of alarm calls is to alert other animals to potential predators. Under this

145 usage, the word ‘meaning’ describes what would trigger these effects, *as if* a signal were an  
146 instance of Gricean communication. Knowledge of the ultimate function of a call can be then used  
147 to guide research into the specific proximate mechanisms involved. Indeed, given that proximate  
148 mechanisms are often the main focus for many comparative psychologists, this is often the very  
149 point of identifying the ‘meaning’ of the signal in the first place. After all, comparisons between  
150 different proximate mechanisms are relevant for many questions in animal cognition, not just  
151 those associated with communication.

152 Another way to describe the intuitive use of the term ‘meaning’ is to say that it describes a  
153 type of natural meaning. In other words, birdsong ‘means’ ‘come mate with me’ in the same way  
154 that clouds ‘mean’ rain: there is a reliable association between one thing in the world and another  
155 (clouds and rain in one case, song and sexual receptivity in the other). This is not to suggest that  
156 clouds are signals. Rather, I am pointing out that animal signals, like clouds, have natural meaning.  
157 A useful term to describe such signals is natural codes: sets of reliable associations that makes  
158 communication possible (Wharton, 2003; 2009; Scott-Phillips, 2014; 2015). Natural codes have  
159 natural meaning.

160 Human languages are *not* natural codes. They do not make communication possible  
161 (Sperber, 1995). Instead, languages are sets of conventional codes. The difference is that whereas  
162 natural codes make communication *possible*, what languages do is make an existing  
163 communication system – one based on Gricean, non-natural meaning – expressively *powerful*  
164 (Wharton, 2009; Scott-Phillips, 2014). Framed this way, the key question for comparisons with  
165 human language is whether the meaning observed in any given case is natural meaning (which is a  
166 product of communication that is made possible by reliable associations between phenomena in  
167 the world) or non-natural meaning (which is a product of communication that is made possible by  
168 the expression and recognition of intentions).



169           This difference between these two approaches to meaning has obvious potential for  
170 confusion and misunderstanding. This is not simply because the two accounts are different, but  
171 also because cross-species comparison of communication, especially when one of those species is  
172 humans, is a topic of inter- and multidisciplinary interest, where audiences with different  
173 backgrounds may come with quite different sets of assumptions and knowledge. In particular,  
174 philosophers and others familiar with the Gricean account of meaning may not be familiar with  
175 the ultimate/proximate distinction. Similarly, students of animal communication may not be  
176 wholly familiar with the details of the Gricean approach. Consequently, it is often not clear exactly  
177 what a researcher who claims that, say, a monkey call ‘means’ ‘eagle!’, actually has in mind: they  
178 could, quite plausibly, be referring either to proximate intentions, or to the signal’s effects and  
179 ultimate functionality. Greater clarity about the intended meaning of such claims is desirable.

180           These two different approaches to meaning do however share one important feature in  
181 common: they are both about how signals *do* things to others (Scott-Phillips, 2010). In one case,  
182 what signals do is change behaviour, and the design comes by virtue of natural selection, which  
183 produces organisms that behave in goal-directed ways (Gardner, 2009). In the other case, what  
184 signals do is change mental states, and the design comes by virtue of human intentions  
185 (notwithstanding the fact that the capacity for this is of course itself a product of natural  
186 selection). This quality – that signals *do* things – is what unites different ways of using the term  
187 meaning.

188           Clearly many animal communication systems only have meaning in the intuitive, ultimate  
189 level sense. It is equally clear that human communication has meaning in the Gricean sense  
190 described in the previous section. Consequently, a key question in comparative cognition is  
191 whether any other species do too.

192

193 **Meaning and intentionality**

194           One prominent concept in the study of animal communication is that of 'intentional  
195 communication' (see Liebal et al., 2014 for a review). In part motivated by comparisons with  
196 language and some other forms of human communication, many studies investigate whether  
197 animal signals are used intentionally, or not. The criteria used to identify intentional  
198 communication vary somewhat across studies (in part due to methodological limitations), but  
199 some general practices have been established, including in particular the appropriate use of  
200 persistence and elaboration (i.e. continued use of a behaviour until its objectives have been met,  
201 and the use of alternative or modified signals in case of failure). Several natural communication  
202 systems have been shown to satisfy these criteria. The most widely attested case is that of great  
203 ape gestural communication (Tomasello, 2008), but there are others, including some in non-  
204 mammalian species, such as the head shakes of grouper fish (Vail et al., 2013).

205           Intentional communication is *not* the same thing as communication that is meaningful in  
206 the Gricean sense. As mentioned, Gricean communication is not only intentional, it is *overtly*  
207 intentional. In other words, not only are signals used in a voluntary (i.e. intentional) way, but this  
208 fact is made explicit (overt) to the audience, and this explicitness contributes to successful  
209 comprehension. Consequently, demonstration of intentionality in animal communication is not  
210 sufficient to demonstrate meaning in the sense that is relevant to comparisons with human  
211 communication. What must also be shown is that the signaller intended to make this intention  
212 explicit, and that this overtness contributes to comprehension.

213           How can these criteria be operationalised for empirical research? One way might be via a  
214 distinction between behaviours where the intentionality is overt, and those where the  
215 intentionality is partially covert. Here is a human example (adapted from Grice, 1989; and  
216 Wharton, 2003):

217           (a) Mary intends that her mother sees that she is unwell. Mary thus greets her mother  
218               with an exaggeratedly sad face, and overtly points to her forehead, which is pale.

219 (b) Mary intends that her mother sees that she is unwell. However, she doesn't want this  
220 intention to be noticed (it might decrease her chances of getting a day off school). So  
221 Mary pretends to be asleep, but ensures that her pale forehead is fully visible.

222 In (a), Mary has an overtly expressed intention that her mother believes she is unwell, whereas in  
223 (b), the same intention is expressed only covertly. By the appropriate use of these two different  
224 behaviours, Mary shows us that she has command over the difference between overtly and  
225 covertly expressed intentions, and hence of (Gricean, non-natural) meaning.

226 We presently have no evidence that any non-human species (primate or otherwise) is able  
227 to make the same distinction. Thus, we have no good evidence that the communication of any  
228 non-human species is meaningful in the way that words and other forms of human  
229 communication are. For a signal to be meaningful in the Gricean sense, it must be overtly  
230 intentional, and we do not have good evidence of overt intentionality in any non-human species. I  
231 mentioned earlier one recent analysis, which claims to report the 'meanings' of chimpanzee  
232 gestures based on documentation of intentionally produced gestures that consistently led to  
233 apparently satisfactory outcomes (Hobaiter & Byrne, 2014). This is not enough to demonstrate  
234 meaning in the sense relevant for comparisons with human language. Overt intentionality has not  
235 been shown, and without this, we do not have grounds to claim that these behaviours have  
236 meaning in the way that human words do.

237

## 238 **Summary and conclusion**

239 How should the term meaning be used? Above I described two ways in which it has been  
240 used – one casual and intuitive, and widely used in animal communication research; the other  
241 philosophical and more precise – and I do not intend to insist that the term be used in the latter  
242 sense alone. This approach is contrary to other critiques, which recommend avoidance of the term  
243 meaning altogether (unless researchers really do mean to refer to Gricean, non-natural meaning).

244 Instead, these critiques suggest alternative terminology, based on the language of influence and  
245 effects, rather than of information, meaning, and associated concepts (Rendall et al., 2009; Owren  
246 et al., 2010). While I certainly agree that meaning is too often used too casually, there are benefits  
247 to the use of intuitive language, in particular plain convenience. Behavioural ecology has long used  
248 the language of intentions and other mental states as shorthand to describe behaviour at the  
249 ultimate level. An expression like “offspring are selected to demand more food than the parent  
250 *wants to give*” is far more easy to use than alternatives that do not use the language of intentions:  
251 “During the course of evolution selection acting on genetic differences in the begging behaviour of  
252 offspring will have favoured an increase in the intensity of begging, and this will have been  
253 favoured to the extent that the level of begging by any individual offspring exceeds the optimum  
254 level for the parent” (example from Krebs & Davies, 1993, p.3). Such practice is not problematic so  
255 long as researchers keep in mind that these are ultimate level descriptions, and use them  
256 accordingly.

257       It is at the proximate level that more explicitness is needed. Researchers that do wish to  
258 discuss whether any particular instance of animal communication is meaningful in the same way  
259 that human words are should make explicit reference to Gricean, non-natural meaning. I am  
260 personally skeptical that any non-human species uses non-natural meaning (Scott-Phillips, 2014;  
261 2015). However, this is ultimately an empirical issue, and the key criterion is that signals should be  
262 overtly intentional. This has to date not been shown in any non-human species.

263

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267

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